NASA TECH BRIEF

Ames Research Center

Wind Tunnel Buffet Load Measuring Technique

A new indirect force measurement technique has been developed for estimating the unsteady forces acting on an elastic model during a wind tunnel test. The general approach used in the technique is to place a wind-tunnel model in the feedback circuit of a servosystem which includes a force generator, a force transducer, and a model response transducer; the servosystem forces the dynamic response of the specimen to follow the input signal. If the input command is a tape recording of the actual response of the model in a wind tunnel, then the force required to reproduce the same response of the model while it is in the feedback loop can be used to estimate the original wind tunnel excitation forces. The magnitude of the force imposed by the force generator is accurately measured by the force transducer. The technique is especially useful for determination of buffet loads in a wind tunnel test.

The technique is a simple and potentially accurate method for determining the resultant of unsteady aerodynamic forces. Moreover, the measurement of forces is practically insensitive to errors in aeroelastic scaling between model and full-scale structure, because most of the model characteristics are cancelled out automatically during the test process. Model design, fabrication, and dynamic calibration are, therefore, simplified.

An interesting application of the technique is the estimation of groundwind loads on a space vehicle while the vehicle is on the launch pad.

Notes:

1. Only a single shaker has been used to reproduce the response; better response over a wider frequency band may be obtainable with multiple shaker systems.
2. No additional documentation is available. Specific questions, however, may be directed to:

   Technology Utilization Officer
   Ames Research Center
   Moffett Field, California 94035
   Reference: B72-10022

Patent status:

No patent action is contemplated by NASA.

Source: C. S. Chang and
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